



January 22, 2020

Melissa Sikes
Technical Administrator
Arizona Department of Water Resources
1110 West Washington Street, Suite 310
Phoenix, AZ 85007

**RE: AMWUA Water Loss Control Technical Assistance & Training Program – Task 3 Complete
(ADWR Contract 2019-3077)**

Dear Ms. Sikes,

The Arizona Municipal Water Users Association (AMWUA) is pleased to inform you that Stage 2 of the AMWUA Water Loss Control Technical Assistance & Training Program (Program) has been completed. Since our last submittal in September, 5 virtual trainings have been held for the participating utilities on the subject of advanced data validation techniques and continued assessment of their Non-revenue water. The AMWUA members engaged in the Program continue to iteratively update their water audits and data validity with the instruction and technical assistance provided by the Southwest Environmental Finance Center (SW EFC).

As was the case with Stage 1, the AMWUA members consistently report that there has been significant learning and value-added to utility operations from the Program. In addition to continual adoption of water loss control best practices, a number of water systems have made specific budgetary plans for capital outlays and infrastructure improvements – a tangible Program outcome that will lead to better water management. As we look to Stage 3 activities in the coming year, we are eagerly anticipating more valuable instruction and technical assistance on the realm of water loss economics and intervention strategies.

Please accept this submission as the Task 3 Deliverable pursuant to Contract 2019-3077. Also included is a "Stage 2 Summary Report" with more detail on the Program accomplishments to date, and an accompanying invoice. We greatly appreciate the opportunity to administer this Program as a result of ADWR's funding and collaboration. Please do not hesitate to reach out if you have any questions or comments.

Best,

Patrick J. Adams
Program Administrator

Arizona Municipal Water Users Association

AMWUA Water Loss Control Training and Technical Assistance Program Stage 2 Progress Report

Submitted to
Arizona Municipal Water Users Association

Submitted by
The Southwest Environmental Finance Center
Center for Water and the Environment
at The University of New Mexico

Program Funding provided by
Arizona Department of Water Resources

December 21, 2020



SOUTHWEST
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MESA • PEORIA • PHOENIX • SCOTTSDALE • TEMPE

Executive Summary:

The Southwest Environmental Finance Center (SW EFC) at the University of New Mexico's Center for Water and the Environment contracted with the Arizona Municipal Water Users Association (AMWUA) to develop and provide a Water Loss Control Training and Technical Assistance Program (Program) to the AMWUA member utilities through a Sponsored Research Agreement dated January 30, 2020. Funding for this program was provided to AMWUA by the Arizona Department of Water Resources.

The utilities participating in the Program serve over 3.6 million people in the most densely populated portions of Arizona. The State of Arizona and the AMWUA Members are keenly aware that water is a precious and limited resource in the desert Southwest. Though the state of Arizona requires utilities to limit "lost and unaccounted for" water below a 10% threshold, the state's reporting requirements do not conform to industry standards and do not have a data validation component. Further, the state reporting requirements focus on real losses, but do not include an industry standard analysis of sources of loss, types of loss, losses classified as apparent loss, or an evaluation of water loss economics.

The Water Loss Control Training and Technical Assistance Program is designed to address these gaps by focusing on development and/or expansion of the utilities' internal capacity to document, evaluate, and address real and apparent water losses in their systems. This will be accomplished by using the industry-recognized and approved best management practices of the American Water Works Association's (AWWA) M36 methodology.

Prior utility experience with the M36 methodology varies, with some systems having had M36-based water audits completed prior to this Program's initiation and others having never engaged with the AWWA's M36 methodology or software. The Program is therefore designed to meet each utility where they are and to build on and enhance existing water loss control efforts by equipping AMWUA member utilities with the knowledge, skills, and experience necessary to implement the M36 water auditing methodology, including the methodology's more advanced practices, beyond the duration of the Program.

Stage 2 of the Program focused on completing Level 1 Validated system water audits for 2019, developing system water loss control goals, understanding the real and apparent loss audit results, initiating deeper levels of analysis based on data made available by the participating systems and laying the groundwork for higher level analysis (such leakage component analysis and 95% confidence level analysis) that will supplement and refine their water audit results in Stage 3.

Participating systems continued to make significant progress while adapting to the ongoing challenges posed by continued virtual training required due to the COVID-19 pandemic, and (in some cases) the loss of key members of their water loss control teams. All nine AMWUA members who began the Program (Avondale, Chandler, Glendale, Goodyear, Mesa, Peoria,

Phoenix, Scottsdale and Tempe) participated in Stage 2 trainings and technical assistance. All nine participating AMWUA systems also refined their 2019 water audits during Stage 2 of the Program using the Preliminary Validation Reports and data collection guides presented to them by the SW EFC at the conclusion of Program Stage 1. These updated water audits were then Level 1 Validated by SW EFC staff. Each participating AMWUA system was given a system-specific Level 1 Validation Report on the same date that this report was submitted to AMWUA.

Each participant's Level 1 Validation Report provides individualized recommendations with respect to data validity including:

- an evaluation of their individual audit data points and data grades,
- recommendations for data collection improvement where applicable, and
- a comparison of each system's key performance indicators to the AMWUA systems' minimum, average and maximum values and to 2019 AWWA benchmark medians and 75th percentile values where available.

The AMWUA systems' minimum, average and maximum values and 2019 AWWA benchmark medians and 75th percentile value comparisons are also included below in Section 1 of this report.

Section 1: Summary of Accomplishments and Challenges

Summary of Accomplishments

Stage 2 consisted of additional water loss control training, working individually with the utilities to finalize and validate their 2019 water audits, and initiating the advanced analysis that will occur in Stage 3. While the Stage 1 trainings were focused on developing an understanding of the M36 water loss audit methodology, Stage 2 training activities were meant to provide more in-depth training on water loss control activities and focused on:

- developing and refining water loss control goals (both audit-related and non-audit-related)
- developing a clear understanding of how to interpret the water audit results (both in individual loss categories, and in total)
- refining internal data collection processes and analysis techniques to develop more accurate water audits with a particular emphasis on calibrating real and apparent loss values
- understanding how audit results can be supplemented, refined and calibrated using advanced leakage component, statistical, and other analysis techniques
- developing action items based on the combined understanding gained from the audit and advanced analysis techniques to refine and achieve the aforementioned goals
- defining internal water auditing processes and firmly establishing water loss control team member responsibilities, and
- laying the groundwork for completing economic and additional “higher level” analysis to be completed in Stage 3 of the Program.

The specific trainings are shown in Table 1 below and are described in more detail in Section 2 of this report.

Table 1: Stage 2 Activities

Task	Date Completed	Attendance*			
		Number of Utilities Represented (of 9)	Utility personnel attending	Non-utility personnel attending (AMWUA; ADWR, AZ Water)	Total attendees
Introductory Webinar	July 22, 2020	8	25	1	38
Goal Setting	September 15, 2020	9	29	1	34

Water Loss Control Activities: Apparent Loss	October 6, 2020	8	19	1	20
Water Loss Control Activities: Real Loss	October 28, 2020	6	13	1	13
Leakage Component Analysis	November 19, 2020	8	16	1	17
Unbilled Authorized Consumption (optional)	December 10, 2020	5	10	0	10
Report Out	December 15, 2020	8	20	2	22
*attendance numbers do not include SW EFC team members					

High levels of participation continued in Stage 2. All nine of the participating AMWUA utilities were able to complete their 2019 water audits and receive Level 1 Validations. SW EFC staff were also able to assist several utilities with activities that typically occur in a higher Level 2 Validation by:

- Developing and corroborating water audit data inputs through analysis of raw data (such as developing CRUC (customer retail unit cost) values, performing weighted average meter accuracy analysis, and tracing audit supply and consumption data back to source data)
- Identifying data inconsistencies (several utilities produced internally inconsistent consumption and supply data)
- Identifying the best sources of data for audit inputs, and
- Assessing available data and preparing the utilities for more in-depth water loss control analysis such as leakage component and statistical analysis

Every system has a Level 1 Validated audit and Validation Report and has started analyzing the volumes of water and value of revenue losses associated with each category. Each system must carefully consider the appropriate actions to control non-revenue water because the profile can be very different from one system to another. For some, the highest contributor to non-revenue water is real loss (leaks), while for others apparent losses are the largest component, and for one system, unbilled metered use is the largest component, due to the recharge water that is processed through their system. Understanding the nature of water loss has led to changes in the way systems discuss and report water loss. Some examples are described below.

Several systems have indicated that they now have plans to improve upon meter pipe configurations, meter replacement planning and meter testing and are making plans to do more in-house analysis with the meter testing data they are currently receiving. One system plans to establish a more robust meter testing program and add a small meter testing program to better understand consumption meters. Another system is budgeting for improvements to the production meter testing program. Yet another system is budgeting for meter replacement and pipe reconfiguration so the meters can read accurately and be tested regularly. Systems that do not currently receive detailed testing data from their contracted meter testing companies are working with the companies to do so.

Two systems have identified aspects of their current operational water use that present opportunities for water loss reduction and are reviewing current practices to determine how best to improve their operational efficiency. One system is focused on improved tracking of plant water use and making changes to operations to reduce excess water use. The other system is focusing on converting well flushing operations from a “set-time” standard to water quality-based flushing procedures to avoid over-flushing or under-flushing.

One Water Resources Manager stated that completing the water audit was one of the most valuable activities they have done as system as it helped them to better understand the system and tighten up reporting.

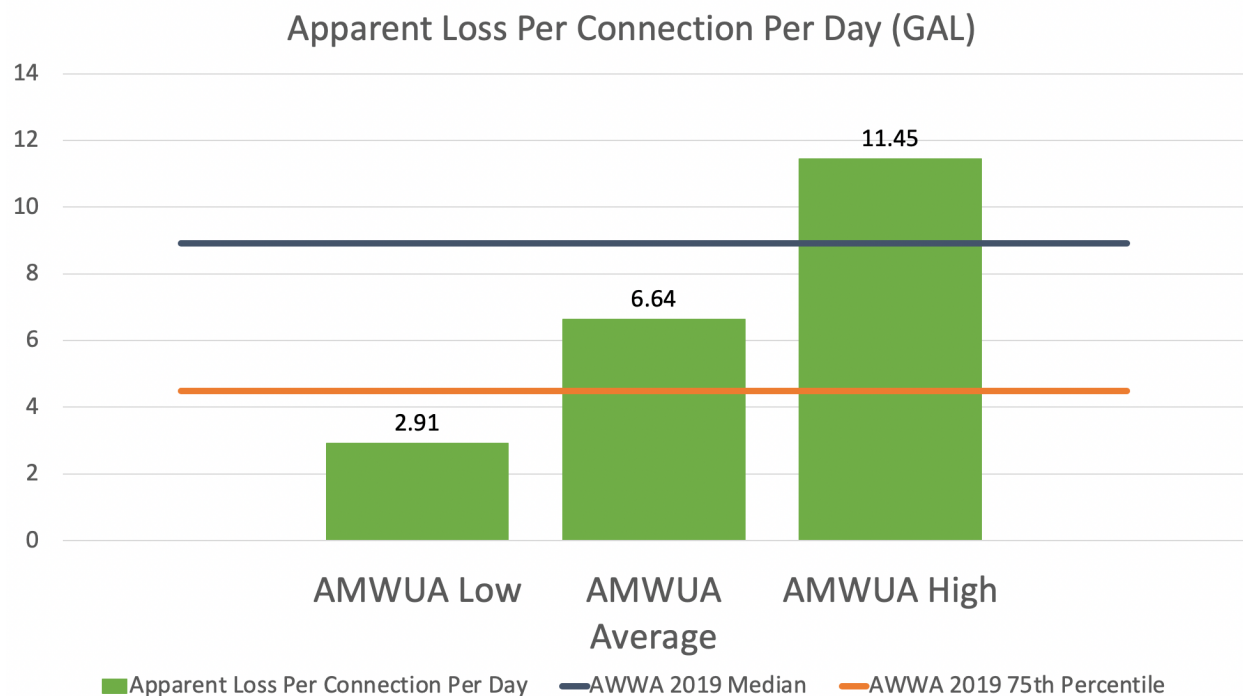
One system, in which the loss reported to the State has always been close to the 10% limit, was able to gain a better understanding that some of the overall losses are actually apparent losses (where water is being consumed within the process) and this helped them to improve their loss reporting.

Many systems stated that gathering the data, itself, was one of the biggest challenges they faced. Data tends to be siloed, where only one or two people can access it. Other systems have realized that while practices are typically consistent, policies and procedures to document those practices are oftentimes lacking, and institutional knowledge is lost when key employees leave. Some systems reported that having everyone on the water loss team understand the need for timely data was a challenge. Some systems were able to improve teamwork throughout this process and gain a better understanding of what other workgroups are responsible for and invite additional personnel to discussions around important water loss topics.

At the conclusion of Stage 2 each system was given a Level 1 Validation Report evaluating their 2019 audit data points and data grades. The summary statistics and comparisons from the AMWUA Level 1 Validated water audits are presented below. The SW EFC expects some additional refinement of these statistics to occur as a result of the analysis that will be undertaken during Stage 3 of the Program.

Apparent Losses per Connection per Day

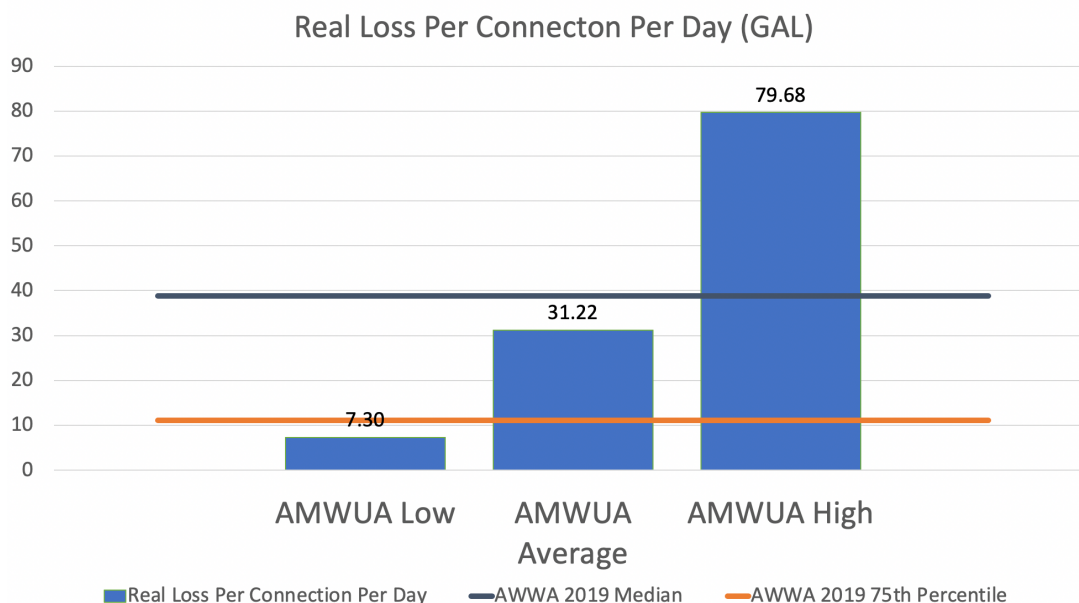
Apparent losses per connection per day in the AMWUA systems are relatively low ranging from 2.91 to 11.45 Gal/Conn/Day, with an average of 6.64 Gal/Conn/Day. The average AMWUA value is significantly lower than the AWWA 2019 Benchmark Median of 8.91 Gal/Conn/Day. Six of the AMWUA systems have apparent losses below the AWWA 2019 Benchmark Median for this performance indicator, and three have apparent loss values below the AWWA 75th Percentile Benchmark value of 4.48 Gal/Conn/Day. Nevertheless, this is a potential area for improvement, particularly for systems with apparent losses on the higher end of the range.



Real Losses per Connection per Day

Real losses per connection per day in the AMWUA systems are spread across a relatively large range, from 7.30 to 79.68 Gal/Conn/Day, with an average of 18.6 Gal/Conn/Day. The average AMWUA value for this performance indicator is slightly lower than the AWWA 2019 Benchmark Median of 38.87 Gal/Conn/Day. Six of the AMWUA systems have apparent losses below the AWWA 2019 Benchmark Median for this performance indicator, and one has apparent loss values below the AWWA 75th Percentile Benchmark value of 11.12 Gal/Conn/Day. The three systems with real losses significantly higher than the AWWA Benchmark Median are the three that serve the largest AMWUA population centers. Normalized real losses are often higher in larger systems, due to the inherent difficulties associated with identifying, locating and repairing leaks across a large area, and these higher reported loss values may partially be due to the size of their distribution networks.

It is important to remember, however, that supply and consumption data errors flow through the water audit and may disguise or artificially increase calculated real loss values. Using the audit defaults in lieu of actual data can have the same effect, where consumption overestimates artificially reduce calculated real loss, and underestimates inflate it. Most of the AMWUA systems used audit defaults for unbilled unmetered consumption, unauthorized consumption (theft), and systematic data handling errors in their 2019 audits. There is likely room for improvement, both in loss control activities and record keeping at most, if not all, of the AMWUA systems. Developing more accurate data to use in lieu of audit defaults in future audits will refine the real loss results. Real loss results may be refined during Stage 3 of the Program through leakage component, and other types of data analysis.



Non-Revenue Water as a Percentage of Operating System Costs

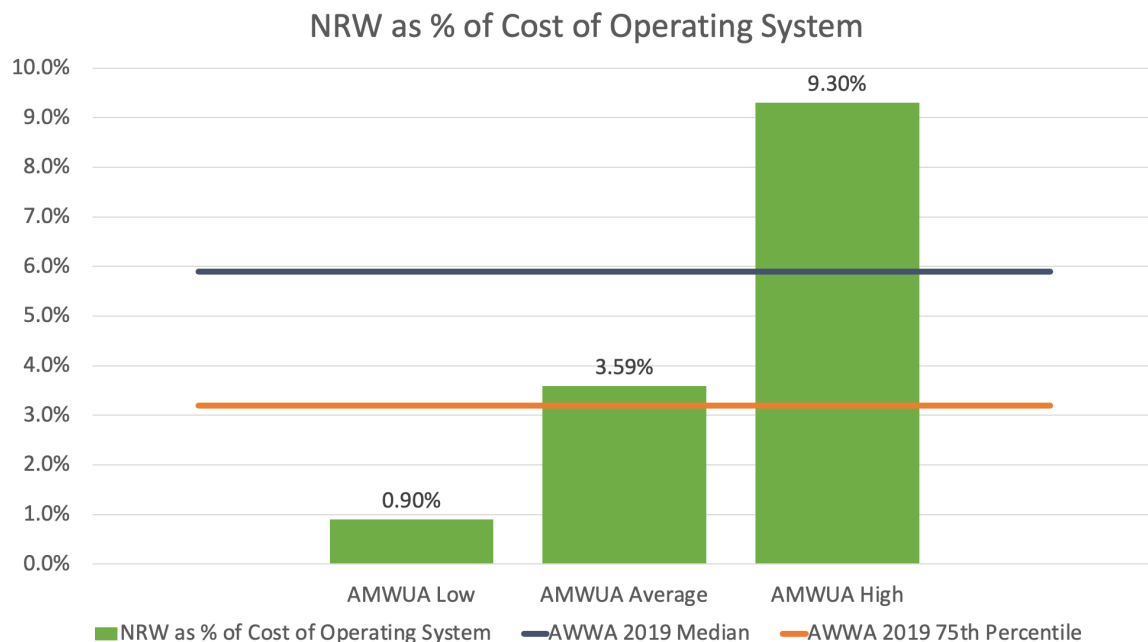
The 2019 AWWA Benchmark Median value for Non-Revenue Water (NRW) as a Percentage of Operating System Costs was 5.9%, and the 75th Percentile Benchmark was 3.2%.

The water audit software allows the user to choose whether to value real losses at:

- variable production cost (VPC) which typically includes only the cost of water, treatment and energy used for pumping water through the distribution system, or
- average customer retail unit cost (CRUC) – the retail charge to customers, which is substantially higher than VPC.

In their 2019 water audits, eight of the participating systems valued their real losses at VPC and one chose to use the CRUC. For consistency the graph below uses each system's variable production cost to value the real loss component of NRW for all of the AMWUA systems. In their audit, however, the AMWUA system shown reporting 9.3% NRW as a Percentage of Operating System Costs in the graph below used the CRUC for this performance metric and reported 54%.

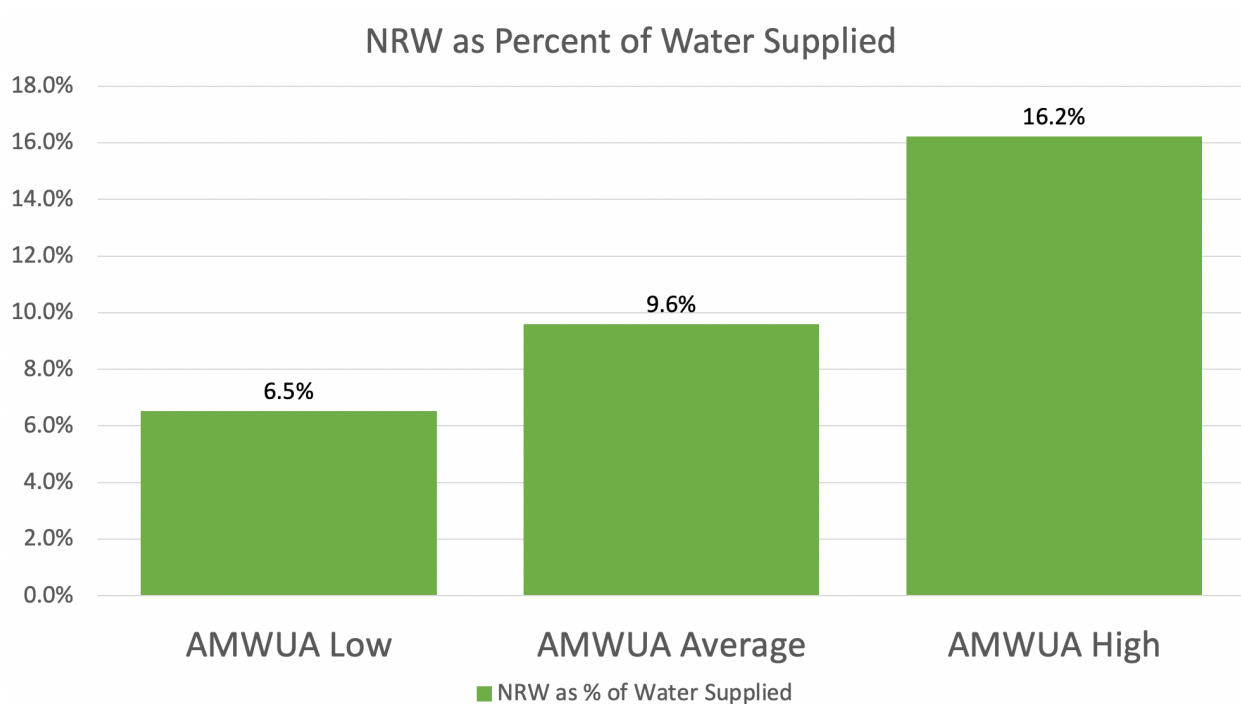
Using VPC, the values in the AMWUA validated water audits range from less than 1% to just over 9%. Eight of the nine systems were lower than the AWWA Benchmark Media and four systems were below the 2019 75th Percentile Benchmark. The AMWUA average is 3.59%, only slightly higher than the 2019 75th Percentile Benchmark for this performance indicator.



Non-Revenue Water as a percentage by Volume of Water Supplied

This metric is phased out in version 6 of the water audit software, and the AWWA does not track benchmarks for this performance indicator, but we have included it because many systems are used to looking at losses as a percentage of supply. It is important to recognize, however, that NRW includes authorized but unbilled consumption which is not water loss. Thus, this performance indicator is not the same as the 10% “lost and unaccounted for” water threshold set by the State of Arizona.

As the graph below indicates, the AMWUA average NRW as a percentage of supply (which includes both real losses, apparent losses and authorized but unbilled consumption) is, slightly below 10%, generally corroborating state filings. Only three AMWUA systems have higher than 10% NRW as a percentage of supply.

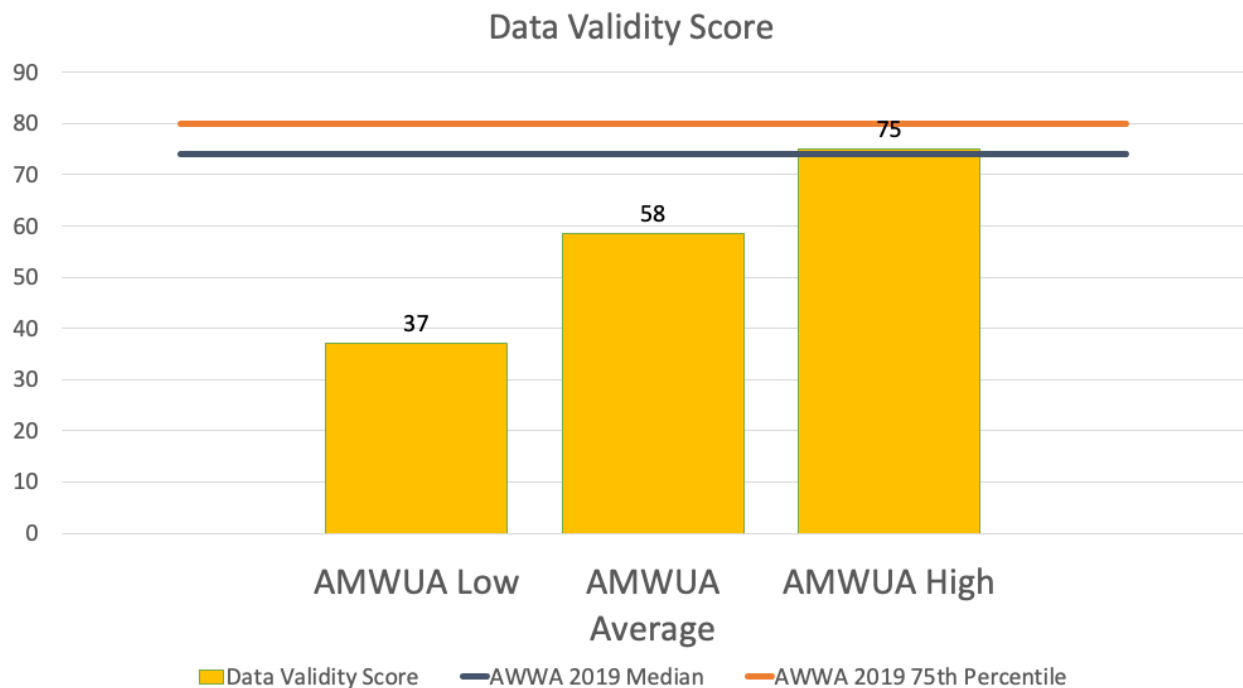


Water Audit Data Validity Score

The graph below charts AMWUA Member validated water audit Data Validity Scores (DVSs) which range from 37 to 75 and average 59. The individual DVSs, and their spread is not surprising given that most of the AMWUA systems are water auditing novices. Only two systems have validated DVSs near or above the 2019 AWWA Median Benchmark value for this performance indicator and none meet or exceed the 2019 75th Percentile Benchmark.

While it was apparent from discussions that the AMWUA systems generally have solid policies, practices and procedures in place, Level 1 Audit validation requires the audit validator to review policies and procedures and evaluate other supporting documentation such as agreements and meter test results to verify that data grading criteria are met. Such supporting documentation must be provided by the utility to support the individual data grades they assign themselves while developing their audits.

While the data grades initially selected by individual systems in their draft water audits may be accurate, many individual data grades could not be validated at the scores the utilities initially assigned because required supporting documentation was not available or was not provided to SW EFC staff. As a result, most system's DVSs have dropped after validation from what was reported at the end of Program Stage 1, and the AMWUA average DVS was lowered from 73 to 58. SW EFC staff will, of course, continue to work with those AMWUA systems that wish to further refine their 2019 water audit DVSs if they can provide the necessary supporting data.



Challenges

The Program continues to be successful, but challenges remain. The format changes required by the COVID-19 pandemic have by necessity impacted the pace of the Program somewhat, and personnel losses at some utilities slowed their progress in Stage 2. For example, Avondale lost its water loss control team leader midway through Stage 2, and Tempe faced reduced capacity for technical assistance in the latter half of Stage 2 because of competing resource demands.

Nevertheless, the SW EFC and AMWUA utilities successfully adjusted to the virtual modes of training and technical assistance, and all nine participating AMWUA utilities completed a Level 1 Validated water audit during Stage 2 as planned. Avondale's new water loss control team leader was able to successfully step into her predecessor's shoes, and the remaining participating AMWUA utilities appear committed to remaining actively engaged in Stage 3 of the Program.

Section 2: Description of Stage 2 Activities

Introductory Webinar

The "Stage 2 Kickoff" webinar was held virtually on July 22, 2020 to introduce the expectations for Stage 2 of the Water Loss Control Training and Technical Assistance Program as well as describe the outcomes of Stage 1 of the Program. Systems were advised that on-going technical assistance would continue to be provided, that they should keep working to finalize the water audits, and be prepared to learn about more advanced water loss control topics. The training schedule for Stage 2 was presented along with a description of the training content.

Apparent Loss Webinar

The "Water Loss Control Activities: Apparent Loss" training was held virtually on October 6, 2020 and included topics that allowed attendees to learn what apparent loss is, assessing apparent loss volumes, values and data validity, ways to evaluate the financial impacts of apparent loss along with what types of component analysis can be completed for apparent losses. Upon completion of the training, the systems were asked to work on an applied activity where they could evaluate the apparent losses in their systems. The systems were to evaluate the volumes of water associated with the Systematic Data Handling Errors, the Customer Meter Inaccuracies and the Unauthorized Usage (theft) in the water audit and develop an action plan for each. The systems were then to look at their customer meter inventory and evaluate a meter testing plan based on the volumes passing through those meters. A spreadsheet was provided for the systems to use to do this inventory work.

Real Loss Webinar

The “Water Loss Control Activities: Real Loss” training was held virtually on October 28, 2020 and was attended by 13 people representing 6 participating utilities. The training focused on:

- Understanding how the water audit calculates real loss and how to interpret real loss results from the water audit
- Assessing the current status of real loss through the water audit, by evaluating loss volumes calculated, the value of those losses and the validity of results
- Understanding the financial implications of audit results using variable production cost and customer retail unit costs and why a utility may choose one over the other to value real losses
- Understanding sources and types of real loss and their typical relative magnitudes
- Understanding sources of data error that may lead to incorrect audit results, and
- The M36 “4 Pillar” approach to real loss control.

The training also included a discussion of:

- the “Real Loss Toolbox” (a set of water loss control tools and techniques that can be used to refine understanding of, and reduce, real loss in distribution systems) and how to determine which tools to apply,
- data required for effective real water loss control with an emphasis on collecting comprehensive leakage and break event data,
- a series of loss control case-studies
- some recent real loss detection technology developments, and
- interpreting of aggregated AMWUA real loss statistics and water audit metrics.

The webinar also included a series of interactive polls in which attendees were asked to:

- Rate the level of concern of service line leaks in their utility
- Rate whether service leaks were a concern to customers
- Identify types of leak detection used
- State to what extent real loss events were tracked, and
- Rate how big a concern main line leaks were in their utility.

Interestingly, while poll responses to individual questions varied somewhat between systems (as was expected), on several occasions the answers varied drastically among individuals working for the same utility. For example, individuals at the same utility answered the question “Are leaks a concern to your customers?” as “don’t know,” “minor,” “moderate” and “major” concern. Similarly, from one utility the answers to the question “How big a concern are main line leaks (or main line breaks) to your system” were “not sure,” “minor,” and “major, but not the biggest.” These results imply that information and understanding may be siloed in some of the AMWUA utilities, and indicate that developing internal transparency, consistent internal

understanding and messaging across utility departments may be an area for development with some of the AMWUA utilities. (This conclusion was corroborated in the Stage 2 Report Out Webinar discussed below where participants mentioned having such information silos, and the need to develop transparency and interaction between departments.)

At the conclusion of the Real Loss training, participants were asked to complete an applied activity in which they were to:

- evaluate the real loss volumes and monetary values calculated by their audits,
- evaluate non-monetary factors associated with real loss, and
- assess what actions were appropriate to address their real losses (e.g., improved monitoring, improved data collection efforts, or the implementation of one or more real loss control measures).

Once actions were identified, the participants were tasked with developing an action plan outlining the type(s) of action to be taken, how the action(s) benefitted the utility, who specifically would undertake the action(s), and which staff should be consulted in the process. Each utility was further tasked with identifying resources that would be necessary to successfully implement the action plan(s). Finally, each utility was tasked with investigating how the action plan(s) and results could be leveraged within the utility for greater impact.

Leakage Component Analysis Webinar

The “Leakage Component Analysis” training was held on November 19, 2020. Topics covered included:

- what component analysis is and how it relates to the water audit
- the specifics of Leakage Component Analysis (LCA) and the deeper insights into audit results that can be gained by completing an LCA to supplement the AWWA water audit
- issues resulting from using audit default values
- loss control actions and the loss control data that should be collected during the regular course of business
- a discussion of data sources, quality, accessibility and format issues, and a review of available tools for data format conversion and LCA, and
- other types of “component adjacent” analysis such as a 95% confidence level analysis, customization of generic water audit KPI, and analysis tools developed by the SW EFC.

At the conclusion of the Component Analysis training participants were asked to complete an applied activity checklist on which they were to identify the types and extent of data that is available to develop a leakage component analysis and 95% confidence level analysis to supplement and refine their water audit results. This checklist will be used to guide further advanced analysis in Stage 3 of the Program. As of the date of this report, two AMWUA utilities have completed the checklist, and most of the other utilities have indicated they are working on it.

Unbilled Authorized Consumption Webinar

The difference between water loss and non-revenue water is unbilled, authorized consumption. There are two categories within unbilled, authorized usage – unbilled metered and unbilled unmetered. The types of flows that typically fall in unbilled, metered usage may include such items as: water or wastewater department buildings, city owned buildings, parks, open spaces, fountains, fire houses, rights of way, and sports fields. These flows are permanent and on-going. A utility often has at least some flow in this category, but it may be a very small amount. The unbilled, unmetered category typically includes uses that are not permanent and on-going but rather intermittent and variable, and may include such items as: street sweeping, sewer system cleaning and flushing, water system flushing, firefighting, hydrant testing, well flushing, and pipe repair flushing. Every utility should have flow in this category as it is not possible to properly operate a utility without it. There is a default value for this flow category and all but two AMWUA systems in the Program chose to use the default.

The SW EFC decided to hold an optional webinar to discuss this type of flow. While every utility has this flow, in all cases, the flow quantities are very small relative to other categories so this flow may not be a priority for many systems at this time. However, we wanted to share information for those systems who were interested in perhaps reviewing this flow more carefully or moving beyond the default value. The webinar was 1 hour in length and covered the following topics:

- What constitutes unbilled, authorized usage?
- Metering uses – when to have meters
- How to estimate uses that are not metered
- Storing information
- Volumes and values of uses in this category
- Making choices about water in this category
- Moving beyond the default in future audits

Ten people representing five of the participating AMWUA systems attended the webinar live. AMWUA systems will also be given the opportunity to watch a recorded version of the webinar at any point. There was a good discussion through the chat feature during the webinar and the training lasted just over 60 minutes.

Report Out Workshop

The “System Report Out” webinar was held on December 15, 2020. The focus of the Report Out session was the AMWUA systems and their accomplishments during Stage 2. Eight of the nine participating systems attended. Each system had approximately 10 minutes to talk about progress, accomplishments, insights and difficulties encountered while completing the system goals, apparent loss, real loss and leakage component analysis applied activities that were

assigned during the course of Stage 2. No formal presentation was required but we did request that all of the AMWUA systems come prepared to actively participate and share accomplishments and challenges. Several systems stated that having regular meetings with the SW EFC was helpful in keeping them focused and on track. Systems are working on developing the water loss goals. One system stated that as they learn more the goals tend to change. Other systems developed goals such as:

- establishing that the water audit will be completed annually
- developing an SOP for the water audit process that includes who is responsible for what data
- developing a mechanism to convey audit results to upper management
- applying water loss thinking to other areas within the system
- better understanding data that supports the audit like exception reports and what we are doing about theft
- keeping the audit data updated monthly and having real-time reports instead of a once-a-year snapshot
- understanding where we are now before converting to AMI meters
- developing SOPs throughout system
- Un-siloing available data and, giving more people access.

Summary of Technical Assistance Provided

Technical assistance was provided as requested by the systems. Five of the systems regularly scheduled meetings (typically weekly or biweekly) to discuss and develop the audit and the applied activities assigned after each training. For 2 systems, meetings occurred less regularly, but as needed to discuss the audit data. For the last 2 systems, meetings were only held once or twice during this Stage due to staffing issues and other system priorities during this time. Ongoing communication between SW EFC staff and all of the systems was maintained via email.

SW EFC staff assisted the AMWUA utilities by (among other things):

- Calculating customer retail unit cost values
- Analyzing audit summary and source data and identifying inconsistencies
- Reviewing meter testing program data and calculating audit supply, import and consumption meter error correction factors with available data
- Identifying necessary support documentation required for Level 1 Validation and assisting with determining which data grades to focus on, and
- Discussing current water loss control programs and making suggestions for improvement

In addition, SW EFC staff held “Water Audit Debrief” sessions for several of the AMWUA utilities during Stage 2 of the Program to support utility water loss control team building efforts and reinforce utility staff understanding of the water audit process and results.

In Stage 1, one system was not fully engaged and did not start work on the audit. In Stage 2, this system was able to engage and began meeting regularly with SW EFC staff. This system was not only able to complete the water loss audit, provide supporting documentation for review and have the audit validated, they were able to take steps to begin component analysis and internally are designing a tool to be able to view their water in real-time by continuing to add data monthly instead of completing the audit annually.

Section 3: Description of Stage 3 Next Steps

The table below lists the topics to be presented during the training sessions of Stage 3. Activities that would have been presented in an in-person workshop format have been re-formatted for virtual training. Technical assistance will continue to be provided for the duration of the Program.

Stage	Virtual Training Name	Length (hrs)
3	Economics of Water Loss	3
3	Developing your Water Audit SOP	2
3	AWWA's Water Audit Software – Understanding Version 6 (optional)	1
3	Report Out / Next Steps / Wrap Up Session for systems to report out	2
	Total:	8

Stage 3 Activities

Stage 3 activities will focus on the economics of water loss control activities, identifying appropriate water loss control strategies and activities based on individual audit results, and a reevaluation of the goals that were set in Stage 2. SW EFC staff will also work with AMWUA utilities to develop water auditing SOPs with defined individual and departmental roles and responsibilities to facilitate future water audits, advanced analysis and water loss control actions.